

# AT-500 HF AUTOTUNER MAINTENANCE

By Adam M. Farson, VA7OJ/AB4OJ.

The Icom AT-500 HF automatic antenna tuner is an exceptionally hardy piece of gear. With reasonable care, it will give many years of good service. Like any electromechanical device, the AT-500 benefits from occasional maintenance (cleaning and lubrication). This will improve its reliability and prolong its useful life. This article addresses three maintenance areas: 1. Motor and gear drive lubrication; 2. Bandswitch cleaning and lubrication; 3. Alignment of the internal reflectometer.

**Prior to starting**, power down the AT-500 and remove top and bottom case covers.

**1. MOTOR AND GEAR DRIVE LUBRICATION** Refer to Figure 1, the IC-AT500 TOP VIEW. The worm gear drives of the capacitor and bandswitch driving motors and, if need be, the motor bearings, should be re-lubricated every three to four years, or when a significant increase in mechanical noise is observed during tuning. Apply an amount of white or yellow nylon-gear grease the size of a match-head to the nylon worm gear on each motor shaft, (L) in Figure 1. Now power up the tuner, and set the front panel bandswitch first to 1.8, then to 24 - 28 to run the motors through the whole tuning range and distribute the grease. If a squeaky motor noise persists, apply a drop of clock oil to the front and rear bearings of each motor. *DO NOT OVER-LUBRICATE!*

**2. BANDSWITCH CLEANING** Refer to (C) in Figure 1. The motor-driven bandswitch does not require routine cleaning. However, the gradual accumulation of dust over time on the film of lubricant on the RF contacts of the switch (S3-1 and S3-2) can ultimately lead to carbon-tracking and arcing. Should arcing ever occur under normal operation (500W input, load SWR less than 3:1), carefully clean the ceramic bandswitch wafers with isopropyl alcohol and a small stiff-bristled brush. Apply sufficient solvent to flush away all dirt and residue. Ensure that the switch wafers and contacts are completely free of carbon dust, brush bristles or other residue. Wait for the solvent to dry. Power up the tuner to run the bandswitch, then carefully re-lubricate the switch contacts with a good contact lube. Apply with a very fine artist's brush. Run the bandswitch again to distribute the lube. The required grease and contact lube can be purchased at an electronics supply house. Do not use TV tuner cleaning products. Again, *DO NOT OVER-LUBRICATE!*

### 3. ALIGNMENT OF THE INTERNAL REFLECTOMETER

#### **Required Equipment:**

Bird (or equivalent) 100W 50 ohm load with coax lead.  
Bird 43 RF wattmeter with 100H element or equiv.

Refer to Figure 1 (MAIN UNIT) and Figure 3 (DET UNIT). This adjustment should be performed if the AT-500's matching accuracy after tuning is degraded to the point that the VSWR at the tuner input is greater than 1.2:1 with a 50 ohm load at the output.

#### **ALIGNMENT PROCEDURE:**

1. Lift wire leading to tuning capacitor C12 off reflectometer output pad (E) in Figure 3, on DET board. Solder centre conductor of dummy load coax to this pad. Solder coax braid to adjacent ground plane.
2. Connect transceiver ANT socket to AT-500 input via RF wattmeter. Set for 100W forward at 7 MHz (RTTY or FM). Check for reflected power < 2W.
3. Connect a high-impedance voltmeter to IC-2 Pin 7 or R24 on MAIN board, (D) in Figure 2.
4. Set AT-500 to AUTO TUNE and power it up.
5. Whilst transmitting, adjust Detection Level Adjust Trimmer C5, (D) in Figure 1, for 0V on meter.
6. Change TX frequency to 1.9 MHz, then to 29 MHz. Check that voltmeter reading is in range -3V to +3V at both frequencies.
7. Connect voltmeter to IC-1 Pin 1 or R21 on MAIN board, (E) in Figure 2. Check that voltmeter reading is in range -3V to +3V at 14 and 29 MHz.

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**Figure 1 - IC-AT500 TOP VIEW**



